

## LAWRENCE LIVERMORE REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: March 29-April 2, 2010

### Tracking down nuclear materials



The Lab's Ian Hutcheon is a nuclear sleuth, so to speak.

His job is to look for evidence of the production of highly enriched uranium or plutonium, the essential components of nuclear weapons.

"Intercepted samples come in all sizes and shapes, very much in the same form -- as if you go down to your local police station and look at the types of evidence that are collected at crime scenes," Hutcheon says.

Hutcheon receives samples from nuclear facilities throughout the world. He then tests them for evidence of illegal materials like highly enriched uranium. It's difficult to differentiate legal material from illegal material, Hutcheon said, because uranium is everywhere.

To read more, go to <http://earthsky.org/human-world/ian-hutcheon-tests-materials-for-evidence-of-illegal-nuclear-activity>

### Go for the gold with green



### **The Laboratory's Terascale Simulation Facility (TSF).**

When it comes to the greening of buildings, Livermore is a step ahead when it comes to really big supercomputing buildings.

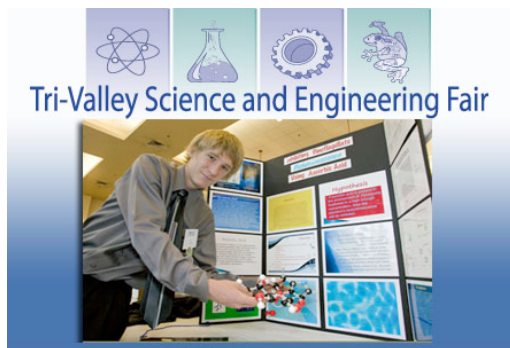
The Laboratory's Terascale Simulation Facility (TSF), which houses some of the world's fastest supercomputers, has received a Leadership in Energy and Environmental Design (LEED) gold level certification under the U.S. Green Building Council rating system.

The TSF is a 253,000-square-foot building that houses Dawn (BlueGene/P), BlueGene/L and ASC Purple -- Advanced Simulation and Computing (ASC) systems largely dedicated to stockpile stewardship. TSF represents an innovative design that emphasizes function over form.

LEED is an internationally recognized green building certification system that provides third-party verification that a building or community was designed and built using strategies aimed at improving performance in energy savings, water efficiency, carbon dioxide emissions reduction as well as other factors.

To read more, go to <http://www.environmentalleader.com/2010/03/30/supercomputer-hub-puts-energy-efficiency-to-work/>

### **Students shine in the spotlight**



**B.J. Kato, from Granada High, and his project, "Inhibition of Dinoflagellate Bioluminescent Using Ascorbic Acid"**

This week, 305 future scientists and engineers packed the Robert Livermore Community Center to discuss their projects with seasoned scientists and judges, and compete for cash and other prizes at the Lab's 14th annual Tri-Valley Science and Engineering Fair (TVSEF).

The best and brightest students from Danville, Dublin, Livermore, Pleasanton, San Ramon and Sunol displayed 201 projects in such categories as chemistry, computer science, physical science and medicine and health.

Judging took place Wednesday with an awards ceremony in the evening. Science projects were judged on a wide range of criteria that represent standards of research held by the scientific community. More than 150 local scientists and engineers served as judges, nearly 70 from the Lab.

To read more, go to [https://newsline.llnl.gov/\\_rev02/articles/2010/apr/04.02.10-tvsef1.php](https://newsline.llnl.gov/_rev02/articles/2010/apr/04.02.10-tvsef1.php)

**Large Hadron Collider launches new physics era**



**Lab physicist David Lange is dwarfed by the 20,000-ton Compact Muon Solenoid (CMS) detector at the Large Hadron Collider, the world's most powerful accelerator.**

Laboratory researchers were among the thousands of scientists around the world who celebrated Tuesday's much-anticipated start of the Large Hadron Collider research program at CERN near Geneva, Switzerland. The first particles collided at the record energy of 7 trillion

electron volts (TeV) in the accelerator's 17-mile magnetic ring, the highest energy yet achieved in a particle accelerator.

"This is the beginning of a new age of experiments," said Doug Wright, LLNL physicist and Lab team leader for the Large Hadron Collider's (LHC) Compact Muon Solenoid (CMS) detector experiment. "Data from the LHC will lead us to a completely new understanding of our universe."

Tuesday's proton collisions were recorded by the LHC experiments' particle detectors, known by their acronyms: ATLAS, CMS, ALICE and LHCb. While the LHC accelerator brings the protons up to their maximum energy and steers them around the 17-mile ring into collision, the experiments use massive particle detectors to record and analyze the collision debris.

The CMS experiment, which the Laboratory helped complete, is a hulking 20,000-ton detector that is searching for the elusive "Higgs boson" and evidence of the nature of dark matter.

For more, go to [https://newsline.llnl.gov/\\_rev02/articles/2010/apr/04.02.10-collider.php](https://newsline.llnl.gov/_rev02/articles/2010/apr/04.02.10-collider.php)

### **Better fuel efficiency through sleek design**



### **Smoke test under way in the NASA Ames wind tunnel.**

The Laboratory recently partnered with Navistar in the world's largest wind tunnel at NASA Ames Research center to test semi-truck trailer devices that could save the nation \$7 billion annually in diesel costs by reducing aerodynamic drag.

The devices' sleek design help cut down on drag that is caused from pressure differences around the vehicle. At highway speeds, a semi-truck uses more than 50 percent of the energy produced by the vehicle engine to overcome aerodynamic drag, while rolling resistance consumes roughly 30 percent of the usable energy.

The full-scale tests began last month at the National Full-Scale Aerodynamics Complex, located at NASA Ames in Moffett Field. The goal was to identify drag reduction devices, both commercially available and under development, that show the potential for improving fuel efficiency. The wind tunnel's size (80 feet by 120 feet) makes it ideal for testing a full-scale semi-truck with a 53-foot trailer.

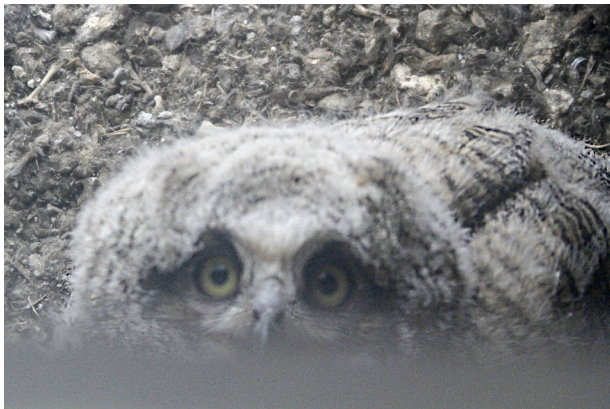
To read more, go to <http://www.thebigredguide.com/news/fuel-efficiency-can-save-7-billion-dollars-annually-according-to-navistar-test.html>

#### **Latest *Newsline* available**



*Newsline* provides the latest Lab research and operations news. See the most recent issue at <https://newsline.llnl.gov>

#### **Photo of the week**



**What big eyes you have:** A great horned owlet nests on the ledge of a Lab building.

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LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

To send input to the Livermore Lab Report, send e-mail <mailto:labreport@llnl.gov>.

The *Livermore Lab Report* archive is available at:  
[https://publicaffairs.llnl.gov/news/lab\\_report/2010index.html](https://publicaffairs.llnl.gov/news/lab_report/2010index.html)